

App. No. 10/501,291
Office Action Dated July 27, 2007

IN THE CLAIMS

Amendments to the claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Claims 1 and 4 are amended.

Claim 3 is canceled without prejudice or disclaimer.

Listing of Claims:

1. (Currently Amended) A method of measuring an amount of a glycated protein as an analyte in a sample, comprising:

causing a fructosyl amino acid oxidase to act on a glycated amino acid present in the sample ~~either than the glycated protein so that the analyte remains in the sample and the glycated amino acid is removed from the sample by degradation as to remove the glycated amino acid by degrading it;~~

degrading the analyte with a protease to give a degradation product of the analyte either before or after causing the fructosyl amino acid oxidase to act on the glycated amino acid; then

causing a fructosyl amino acid oxidase to act on a proteolytic degradation product of the glycated protein analyte to cause a redox reaction in the presence of a tetrazolium compound and sodium azide; and

measuring an amount of hydrogen peroxide generated by the redox reaction to determine the amount of the glycated protein analyte.

wherein the measurement of the amount of hydrogen peroxide comprises

adding a color-developing substrate to allow a redox reaction between the color-developing substrate and the hydrogen peroxide, and

measuring an amount of color developed by the color-developing substrate to determine the amount of the hydrogen peroxide.

2. (Original) The method according to claim 1, wherein the glycated protein is glycated hemoglobin.

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3. (Canceled)

4. (Currently Amended) The method according to claim 1, wherein ~~the measurement of the redox reaction is measurement of an amount of hydrogen peroxide formed by causing the fructosyl amino acid oxidase to act on the glycated protein, the measurement of the amount of the hydrogen peroxide comprising:~~ further comprises

adding N-(carboxymethylaminocarbonyl)-4,4'-bis(dimethylamino) diphenylamine sodium salt as ~~[[a]]~~ the color-developing substrate to a reaction solution of the redox reaction in the presence of a surfactant, ~~thereby causing a redox reaction between the color-developing substrate and the hydrogen peroxide;~~ and

~~measuring an amount of color developed by the color-developing substrate to determine the amount of the hydrogen peroxide,~~

~~wherein,~~ a concentration of the tetrazolium compound in the reaction solution is in a range from 0.5 to 8 mmol/l, a concentration of the sodium azide in the reaction solution is in a range from 0.08 to 0.8 mmol/l, a concentration of the surfactant in the reaction solution is in a range from 0.3 to 10 mmol/l, and a pH of the reaction solution is in a range from 7.0 to 8.5.

5. (Original) The method according to claim 1, wherein the fructosyl amino acid oxidase caused to act on the glycated amino acid is specific for a glycated α -amino group, and the fructosyl amino acid oxidase caused to act on the glycated protein is specific for a glycated α -amino group and a glycated side chain of an amino acid residue.

6. (Previously presented) The method according to claim 1, wherein a solution containing the tetrazolium compound and the sodium azide is aged by leaving the solution to stand at a temperature in the range from 20°C to 60°C for 6 to 120 hours and is then added to the sample.

7. (Original) The method according to claim 1, wherein the tetrazolium compound is 2-(4-iodophenyl)-3-(2,4-dinitrophenyl)-5-(2,4-disulfophenyl)-2H-tetrazolium salt.

8. (Original) A method of determining a ratio of glycated hemoglobin to hemoglobin, comprising:

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measuring an amount of glycated hemoglobin in a sample by the method according to claim 1;

measuring an amount of hemoglobin in the sample; and

calculating the ratio of the glycated hemoglobin to the hemoglobin using the amount of the glycated hemoglobin and the amount of the hemoglobin thus measured.

9. (Previously presented) A measuring kit used for measuring a glycated protein using a redox reaction, comprising:

a pretreatment reagent for pretreating a sample, containing a first fructosyl amino acid oxidase; and

a color-developing reagent containing a second fructosyl amino acid oxidase, an oxidoreductase, and a color-developing substrate.

10. (Original) The measuring kit according to claim 9, wherein the glycated protein is glycated hemoglobin.

11. (Previously presented) The measuring kit according to claim 9, wherein the first fructosyl amino acid oxidase contained in the pretreatment reagent is specific for a glycated α -amino group, and the second fructosyl amino acid oxidase contained in the color-developing reagent is specific for a glycated α -amino group and a glycated side chain of an amino acid residue.

12. (Original) The measuring kit according to claim 9, further comprising a protease reagent containing a protease.

13. (Original) The measuring kit according to claim 12, wherein the protease is at least one protease selected from the group consisting of metalloproteinases, bromelain, papain, trypsin, proteinase K, subtilisin, and aminopeptidase.

14. (Original) The measuring kit according to claim 12, wherein the protease is at least one protease that degrades glycated hemoglobin selectively and is selected from the group

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consisting of metalloproteinases, bromelain, papain, trypsin derived from porcine pancreas, and protease derived from *Bacillus subtilis*.

15. (Original) The measuring kit according to claim 12, wherein the protease reagent further contains a tetrazolium compound and sodium azide.

16. (Original) The measuring kit according to claim 15, wherein, in the protease reagent, the tetrazolium compound (A) and the sodium azide (B) are present at a ratio (molar ratio A : B) in a range from 20 : 3 to 20 : 12.

17. (Previously presented) The measuring kit according to claim 12, wherein the protease reagent contains a metalloproteinase as the protease and further contains Ca and Na, and a concentration of the metalloproteinase is in a range from 100 to 40,000 KU/l, a concentration of Ca is in a range from 0.1 to 50 mmol/l, and a concentration of Na is in a range from 5 to 1000 mmol/l.

18. (Original) The measuring kit according to claim 9, wherein the color-developing substrate is N-(carboxymethylaminocarbonyl)-4,4'-bis(dimethylamino) diphenylamine sodium salt.

19. (Original) The measuring kit according to claim 9, wherein at least one of the pretreatment reagent and the color-developing reagent further contains a surfactant.

20. (Original) The measuring kit according to claim 12, wherein the protease reagent further contains a surfactant.

21. (Previously presented) The measuring kit according to claim 19, wherein the surfactant is at least one surfactant selected from the group consisting of polyoxyethylene ethers, polyoxyethylene phenol ethers, polyoxyethylene sorbitan alkyl esters, and polyoxyethylene alkyl ethers.

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22. (Original) The measuring kit according to claim 9, wherein the pretreatment reagent further contains at least one buffer selected from the group consisting of CHES, MOPS, TAPS, EPPS, phosphate, HEPPSO, POPSO, and borate, and a pH of the pretreatment reagent is in a range from 8.0 to 10.0.
23. (Original) The measuring kit according to claim 9, wherein the color-developing reagent further contains at least one buffer selected from the group consisting of MES, Tris, phosphate, MOPS, TES, HEPES, HEPPSO, and EPPS, and a pH of the color-developing reagent in a range from 6.0 to 9.0.
24. (Original) The measuring kit according to claim 12, wherein the protease reagent further contains at least one buffer selected from the group consisting of Tris, MES, DIPSO, TES, POPSO, HEPES, MOPSO, Bis-Tris, MOPS, ADA, PIPES, ACES, and phosphate, and a pH of the protease reagent is in a range from 5.0 to 7.0.
25. (Original) The measuring kit according to claim 15, wherein the tetrazolium compound is 2-(4-iodophenyl)-3-(2,4-dinitrophenyl)-5-(2,4-disulfophenyl)-2H-tetrazolium salt.
26. (Original) The measuring kit according to claim 9, wherein the pretreatment reagent further contains at least one of uricase and bilirubin oxidase.
27. (Original) The measuring kit according to claim 9, wherein the color-developing reagent further contains sodium azide.
28. (Previously presented) The measuring kit according to claim 22, wherein
the first fructosyl amino acid oxidase in the pretreatment reagent is specific for a glycated α -amino group;
in the pretreatment reagent, a concentration of the first fructosyl amino acid oxidase is in a range from 10 to 5000 U/l and a concentration of the buffer is in a range from 5 to 200 mmol/l; and
a pH of the pretreatment reagent is in a range from 8.0 to 10.0.

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29. (Previously presented) The measuring kit according to claim 15, wherein
the protease reagent further contains Ca, Na, and a buffer;
the protease in the protease reagent is a metalloproteinase;
in the protease reagent, a concentration of the metalloproteinase is in a range from 100 to 10,000 KU/l, a concentration of the tetrazolium compound is in a range from 0.1 to 10 mmol/l, a concentration of the sodium azide is in a range from 0.08 to 4 mmol/l, a concentration of Ca is in a range from 0.1 to 50 mmol/l, a concentration of Na is in a range from 5 to 1000 mmol/l, and a concentration of the buffer is in a range from 0.1 to 500 mmol/l;
and

a pH of the protease reagent is in a range from 5.0 to 7.0.

30. (Previously presented) The measuring kit according to claim 23, wherein,
in the color-developing reagent, the second fructosyl amino acid oxidase is specific for a glycated α -amino group and a glycated side chain of an amino acid residue, the oxidoreductase is a peroxidase, and the color-developing substrate is N-(carboxymethylaminocarbonyl)-4,4'-bis(dimethylamino) diphenylamine sodium salt;

in the color-developing reagent, a concentration of the second fructosyl amino acid oxidase is in a range from 100 to 50,000 U/l, a concentration of the peroxidase is in a range from 0.1 to 400 KU/l, a concentration of the N-(carboxymethylaminocarbonyl)-4,4'-bis(dimethylamino)diphenylamine sodium salt is in a range from 0.02 to 2 mmol/l, and a concentration of the buffer is in a range from 10 to 500 mol/l; and

a pH of the color-developing reagent is in a range from 6 to 9.